

07-14-00

FRIEDRICH KUEFFNER
PATENT AND TRADEMARK ATTORNEY

4
342 MADISON AVENUE
SUITE 1921
NEW YORK, NEW YORK 10173
TELEPHONE: (212) 986-3114
TELECOPIER: (212) 986-3461
(212) 697-3004

jc846 U.S. PTO



07/13/00

EXPRESS MAIL No.: **EL 599 502 619 US** Deposited: **July 13, 2000**

I hereby certify that this correspondence is being deposited with the United States Postal Service Express mail under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, DC 20231.

Fk Kueffner
Friedrich Kueffner

jc869 U.S. PTO
09/615097
07/13/00

ASSISTANT COMMISSIONER FOR PATENTS
Washington, DC 20231

Date: **July 13, 2000**
Docket No: **HM-345**

Sir:

Transmitted herewith for filing is the patent application of:

Inventor(s): **Axel Weyer, Dirk Letzel, Reiner Külchen and Adolf Zajber**

FOR: **METHOD AND DEVICE FOR CHANGE OF SECTION OF A BILLET OF A CONTINUOUS CASTING PLANT DURING CONTINUOUS CASTING**

ENCLOSED ARE:

- (X) Specification (17 pages), Claims (6 pages/11 claims) & Abstract;
(X) two (2) sheets of Drawings; (Figs. 1 and 2)
(X) Declaration and Power of Attorney; **UNSIGNED**
() Assignment to SMS Schloemann-Siemag Aktiengesellschaft;
() Certified copy of GermanPat.Appli.No. 199 33 635.0 filed July 17, 1999
the priority of which is claimed under 35 USC 119;
() Verified Statement to establish Small Entity Status (37 CFR 1.9 & 1.27);
() Information Disclosure Statement, PTO-1449 and ___ references;

THE FILING FEE HAS BEEN CALCULATED AS SHOWN BELOW:

	Claims filed	Extra	SMALL ENTITY	or	LARGE ENTITY
Basic Fee			\$ 345.00		\$ 690.00
Total Claims	11	-20=	x \$ 9.=	x	\$ 18.=
Indep. Claims	1	- 3=	x \$ 39.=	x	\$ 78.=
() Multiple Dependent Claim Presented?			x \$130.=	x	\$260.=

Respectfully submitted

Fk Kueffner

FK:ml

Friedrich Kueffner - Reg. No. 29,482

APPLICATION FOR UNITED STATES LETTERS PATENT

METHOD AND DEVICE FOR CHANGE OF SECTION OF A BILLET
OF A CONTINUOUS CASTING PLANT DURING CONTINUOUS
CASTING

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a method for changing the section of a billet of a continuous casting plant during continuous casting operation wherein opposed sides of the billet are in operative contact with oppositely arranged roll supports positioned below a casting die, wherein the roll supports are divided into sequentially arranged segments that support rolls and are connected to one another by jointed connections, wherein each segment is independently adjustable with regard to an angle relative to the billet, and wherein in an initial position the billet guide to be changed is adjusted to a uniform production format thickness (section of the billet). The invention also relates to a device for performing the method.

2. Description of the Related Art

The change of section of a billet in continuous casting plants during the continuous casting operation is an absolute requirement for optimizing production. However, in the past it was necessary to reduce the casting speed for a period of time for the purpose of thickness (section)

reduction or thickness (section) increase. This results in production losses, and the entire course of the production is at least momentarily thrown off balance. Moreover, in the currently practiced methods it is only possible to perform a fixedly adjusted, stepped change of section.

The patent document EP 0 450 391 B1 discloses a device for supporting a metal billet, especially for soft reduction, in a strip casting plant wherein below the continuous casting die on both sides of the billet mirror-symmetrically and oppositely arranged roll supports are provided whose rolls are in operative contact with the billet. Each roll support is arranged on a stationary frame and divided into several roll-supporting segments which are connected to adjusting devices. The roll-supporting segments are connected with articulation to one another such that each segment can be independently adjusted at any desired angle relative to the billet and fixed in this position, wherein the upper adjusting device is used for the general adjustment of the roll support. This adjusting device can be a mechanical, a hydraulic or a mechanic-hydraulic adjusting device.

The patent document DE 43 38 805 C2 discloses a method and a device for operating a continuous casting plant,

especially for cast-on of a continuous casting plant for producing thin slabs for hot strip rolling, with at least one reduction roll pair arranged downstream of the continuous casting die. Moveable thin slab guiding elements are positioned downstream of the reduction roll pair. The reduction roll pair is adjusted, after a predetermined length of the hot strip has passed through, to a smaller gap width which results in squeezing off of the liquid phase. The hot strip is shaped to a cast-on format having a thickness which is less than the thickness of the desired final format. The strip guiding elements, respectively, the reduction roll pair, are subsequently, preferably successively, adjusted to the thickness of the final format as soon as the cast-on format of reduced thickness is completely positioned within their adjusting area. The reduction roll pair is pressure-controlled and is positioned in accordance with the final format after the strip guiding elements have been advanced.

The patent document EP 0 743 116 A1 discloses a vertical casting production line for billets, comprising a casting die as well as a component group with foot rolls downstream of the exit of the casting die, moreover a plurality of guiding units, a correlated vertical roll segment as well as a driver arrangement in connection with a

horizontal segment of the casting production line. The guiding units comprise at least the entire vertical segment of the casting production line wherein at least a portion of the rolls of the guiding elements cooperate with adjusting devices which are controlled by a process data unit in order to ensure a controllable soft reduction at least in the second part of the vertical segments.

The patent document DE 196 39 297 A1 discloses a method and a device for high-speed continuous casting plants with a billet thickness reduction during solidification. In the method and the corresponding device for continuous casting of billets whose cross-section is reduced during the solidification, wherein casting is preferably performed with an oscillating casting die, the billet cross-section is reduced linearly along a minimal length of the billet guide directly below the casting die. By means of the subsequent further billet cross-section reduction along the remaining billet guide, the so-called soft reduction, up to a point maximally directly before the final solidification or the liquid phase tip, a critical deformation of the billet can be prevented by taking into consideration the casting speed as well as the steel quality.

Parameter	Value	Unit
Initial concentration	1.0	g/L
Initial pH	7.0	
Temperature	25	°C
Time	0-120	min
Agitation speed	150	rpm
Batch size	100	mL
Adsorbent dose	0.1-1.0	g/L
Adsorbent type	Activated carbon	
Adsorbent surface area	1000	m ² /g
Adsorbent pore volume	0.5	cm ³ /g
Adsorbent density	1.5	g/cm ³
Adsorbent particle size	0.15-0.25	mm
Adsorbent batch	1	
Adsorbent storage	Room temperature	
Adsorbent treatment	None	
Adsorbent regeneration	None	
Adsorbent disposal	Landfill	
Adsorbent reuse	None	
Adsorbent cost	0.5	\$/kg
Adsorbent availability	High	
Adsorbent stability	High	
Adsorbent toxicity	Low	
Adsorbent biodegradability	Low	
Adsorbent recyclability	Low	
Adsorbent sustainability	Low	
Adsorbent social acceptability	Low	
Adsorbent regulatory compliance	Low	
Adsorbent overall performance	Low	

Parameter	Value	Unit
Initial concentration	1.0	g/L
Initial pH	7.0	
Temperature	25	°C
Time	0-120	min
Agitation speed	150	rpm
Batch size	100	mL
Adsorbent dose	0.1-1.0	g/L
Adsorbent type	Activated carbon	
Adsorbent surface area	1000	m ² /g
Adsorbent pore volume	0.5	cm ³ /g
Adsorbent density	1.5	g/cm ³
Adsorbent particle size	0.15-0.25	mm
Adsorbent batch	1	
Adsorbent storage	Room temperature	
Adsorbent treatment	None	
Adsorbent regeneration	None	
Adsorbent disposal	Landfill	
Adsorbent reuse	None	
Adsorbent cost	0.5	\$/kg
Adsorbent availability	High	
Adsorbent stability	High	
Adsorbent toxicity	Low	
Adsorbent biodegradability	Low	
Adsorbent recyclability	Low	
Adsorbent sustainability	Low	
Adsorbent social acceptability	Low	
Adsorbent regulatory compliance	Low	
Adsorbent overall performance	Low	

Parameter	Value	Unit
Initial concentration	1.0	g/L
Initial pH	7.0	
Temperature	25	°C
Time	0-120	min
Agitation speed	150	rpm
Batch size	100	mL
Adsorbent dose	0.1-1.0	g/L
Adsorbent type	Activated carbon	
Adsorbent surface area	1000	m ² /g
Adsorbent pore volume	0.5	cm ³ /g
Adsorbent density	1.5	g/cm ³
Adsorbent particle size	0.15-0.25	mm
Adsorbent batch	1	
Adsorbent storage	Room temperature	
Adsorbent treatment	None	
Adsorbent regeneration	None	
Adsorbent disposal	Landfill	
Adsorbent reuse	None	
Adsorbent cost	0.5	\$/kg
Adsorbent availability	High	
Adsorbent stability	High	
Adsorbent toxicity	Low	
Adsorbent biodegradability	Low	
Adsorbent recyclability	Low	
Adsorbent sustainability	Low	
Adsorbent social acceptability	Low	
Adsorbent regulatory compliance	Low	
Adsorbent overall performance	Low	

- | Parameter | Value | Unit |
|----------------------------------|------------------|--------------------|
| Initial concentration | 1.0 | g/L |
| Initial pH | 7.0 | |
| Temperature | 25 | °C |
| Time | 0-120 | min |
| Agitation speed | 150 | rpm |
| Batch size | 100 | mL |
| Adsorbent dose | 0.1-1.0 | g/L |
| Adsorbent type | Activated carbon | |
| Adsorbent surface area | 1000 | m ² /g |
| Adsorbent pore volume | 0.5 | cm ³ /g |
| Adsorbent density | 0.5 | g/cm ³ |
| Adsorbent particle size | 0.15-0.25 | mm |
| Adsorbent batch | 1 | |
| Adsorbent storage | Room temperature | |
| Adsorbent treatment | None | |
| Adsorbent regeneration | None | |
| Adsorbent disposal | Landfill | |
| Adsorbent reuse | None | |
| Adsorbent cost | 0.1 | \$/g |
| Adsorbent availability | High | |
| Adsorbent stability | High | |
| Adsorbent toxicity | Low | |
| Adsorbent biodegradability | Low | |
| Adsorbent recyclability | Low | |
| Adsorbent renewability | Low | |
| Adsorbent sustainability | Low | |
| Adsorbent social acceptability | Low | |
| Adsorbent regulatory compliance | Low | |
| Adsorbent lifecycle assessment | Low | |
| Adsorbent environmental impact | Low | |
| Adsorbent carbon footprint | Low | |
| Adsorbent water footprint | Low | |
| Adsorbent energy footprint | Low | |
| Adsorbent land footprint | Low | |
| Adsorbent air footprint | Low | |
| Adsorbent noise footprint | Low | |
| Adsorbent waste footprint | Low | |
| Adsorbent total footprint | Low | |
| Adsorbent overall sustainability | Low | |

identical steps the adjustment of the segments $n = 3, 4$ to i to the target position is carried out.

According to a further embodiment of the method of the invention, it is proposed that the advancing of the segments is carried out with constant speed by dynamic position control, wherein a predetermined force threshold value is not surpassed.

Moreover, it is suggested according to the invention to calculate the adjusting speed of the segments by taking into consideration the permissible billet elongation limit and the current casting speed in connection with the current format adjustment, respectively, according to the resulting volume flow of the billet. Advantageously, the adjusting speed is calculated via the current casting speed, the segment length, and the required adjusting stroke according to the equation

$$V = D_s / L_s * V_{\text{cast}}$$

wherein D_s is the format thickness change (change of section), L_s is the segment length, and V_{cast} is the current casting speed.

Further developments of the method propose that the adjusting process is monitored, for example, by the current

cylinder pressures of hydraulic adjusting devices and, when a threshold value is surpassed, the method switches from position control to force control and, after reaching the target position, switches back to position control.

Finally, it is suggested that the respective adjusting speeds of the exit side and the inlet side of adjoining segments are inevitably synchronous due to the jointed connection of the exit side of the segment with the inlet side of the adjoining segment.

In a device for format thickness change of the billet of a continuous casting plant, wherein opposed sides of the billet are in operative contact with oppositely arranged roll supports below the casting die, wherein the roll supports are divided into sequentially arranged segments that support rolls and are connected to one another by jointed connections, and wherein each segment is independently adjustable with regard to an angle relative to the billet, the adjusting devices are advantageously provided with means for position or force control. Expediently, the segments are in cooperative connection with controlled and direction-reversing hydraulic cylinders in the area of their jointed connections between the exit side and the inlet side.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

Fig. 1 shows the sequence of adjusting steps of the method according to the invention, illustrated in sequential phases, for format thickness reduction; and

Fig. 2 shows the sequence of adjusting steps of the method according to the invention, illustrated in sequential phases, for format thickness increase.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 shows the individual method steps of the method according to the invention for a format thickness reduction of the billet 9 of a continuous casting plant in continuous casting operation. Below the casting die 10 the billet 9 is in operative contact on both opposite sides with mirror-symmetrically arranged roll supports 8, 8' which are divided into sequentially arranged roll-supporting segments 1 through 4 connected to one another by jointed connections 5 through 7. Each segment 1 through 4 is adjustable independently with respect to its angled position relative to the billet 9. In an initial position the entire billet guide comprised of the roll supports is adjusted to a uniform production format thickness as illustrated in the initial position (to the left in Fig. 1). The format thickness change (change of section) is performed in a controlled sequence of adjusting steps of the segments 1 through 4. The format thickness reduction is carried out by sequentially advancing the sequentially arranged segments 1 through 4 in the casting direction; this is illustrated by the phases 1 through 4 of Fig. 1. Beginning with the exit side of the segment 1 the jointed connection 5, together with inlet side of segment 2, is advanced by set-point control.

After reaching the target position, i.e., the segment position for the target section, the exit side of the segment 2 and the inlet side of the segment 3 are advanced in a second adjusting step, and in a sequence of identical steps the adjustment of the segments 3 and 4 is performed according to the illustrated phases 3 and 4. For this purpose, force-applying means 11 act on the jointed connection 5 in the direction of reducing the billet 9, followed in the phase 2 by the action of the adjusting device 12 in the direction of reducing the billet cross-section, and further sequentially in phase 3 and phase 4 by the action of the adjusting devices 13 and 14 until a continuous overall reduced format thickness is reached according to the final state of phase 4.

Based on the illustration of the course of the method for a format thickness reduction illustrated in Fig. 1, in the initial position present before the phase 1 the entire billet guide (roll supports) is adjusted to a production thickness X during the casting operation. The casting speed is constant; the liquid phase tip (solidification point) is within the segment 3.

For starting the thickness reduction according to phase 1, as has been mentioned before, the exit side of the

What is claimed is:

1. A method for changing the section of a billet of a continuous casting plant during continuous casting, wherein opposed sides of the billet are in contact with oppositely positioned roll supports arranged below a continuous casting die, wherein the roll supports are comprised of segments having rolls, wherein adjoining ones of the segments of each roll support are connected to one another by a jointed connection and wherein each segment is configured to be adjustable independent of the other segments with respect to an angular position relative to the billet, and wherein in an initial position of the segments of the roll supports are adjusted to a uniform billet section; the method comprising the step of:

advancing sequentially in a direction of continuous casting the segments toward the billet by moving the jointed connections toward the billet in a controlled sequence of adjusting steps for reducing the section of the billet; or

moving sequentially in a direction of continuous casting the segments away from the billet by moving the jointed connections away from the billet in a controlled sequence of adjusting steps for increasing the section of the billet.

00615097.074300

2. The method according to claim 1, wherein, for reducing the section of the billet with a constant casting speed and with the solidification point of the billet having passed the first and second segments, an exit side of the first segment and an inlet side of the second segment in the casting direction are advanced in a first one of the adjusting steps toward the billet by moving the first and second segments at the jointed connection connecting the first and second segments toward the billet by set-point control, and after the first and second segments have reached a target position, an exit side of the second segment and an inlet side of the third segment in the casting direction are advanced in a second one of the adjusting steps toward the billet by moving the second and third segments at the jointed connection connecting the second and third segments toward the billet, and after the second and third segments have reached a target position, in further ones of the adjusting steps the third and further segments are advanced toward the billet sequentially in the same manner until all segments have reached the target position.

3. The method according to claim 1, wherein, for increasing the section of the billet with a constant casting speed and with the solidification point of the billet having

passed the first and second segments, the exit side of the first segment and the inlet side of the second segment in the casting direction are moved away from the billet in a first one of the adjusting steps by moving the first and second segments at the jointed connection connecting the first and second segments away from the billet by set-point control, and, after the first and second segments have reached a target position, the exit side of the second segment and the inlet side of the third segment in the casting direction are moved away from the billet in a second one of the adjusting steps by moving the second and third segments at the jointed connection connecting the second and third segments away from the billet, and, after the second and third segments have reached a target position, in further ones of the adjusting steps the third and further segments and so forth are moved away from the billet sequentially in the same manner until all segments have reached the target position.

4. The method according to claim 1, wherein the segments are adjusted at a constant adjusting speed with dynamic position control, wherein a predetermined force threshold value is not surpassed.

5. The method according to claim 1, further

comprising the step of calculating an adjusting speed of the segments for advancing or moving away the segments based on permissible billet elongation limit, the current casting speed, the current section adjustment, and the resulting volume flow of the billet.

6. The method according to claim 5, wherein the adjusting speed is calculated, based on the current casting speed, the segment length, and the required adjusting stroke of the segments, by the equation

$$V = Ds/Ls * Vcast$$

wherein Ds is the section change, Ls is the segment length, and Vcast is the current casting speed.

7. The method according to claim 1, wherein the adjusting steps are carried out by hydraulic adjusting devices, further comprising the step of monitoring the adjusting steps via current cylinder pressure of the hydraulic adjusting devices, wherein, when a predetermined force threshold value is surpassed, force control is applied instead of position control and wherein, when the target position has been reached, the position control is applied again.

8. The method according to claim 1, wherein, because

of the jointed connections, the adjusting speed of an exit side of one of the segments and the adjusting speed of an inlet side of an adjoining one of the segments in the casting direction are synchronous.

9. The method according to claim 1, wherein the adjusting steps are hydraulically controlled and wherein the adjusting steps begin at an exit side of the first segment in the casting direction and are sequentially continued simultaneously at an inlet side and an exit side of the sequential segments.

10. A device for performing the method according to claim 1, the device comprising:

a first roll support and a second roll support positioned opposite one another and configured to receive a billet therebetween;

the first and second roll supports comprised of segments having rolls, wherein adjoining ones of the segments of each roll support are connected to one another by a jointed connection and wherein each one of the segments is configured to be adjustable independent of the other segments with respect to an angular position relative to the billet;

an adjusting device configured to move the

segments of the first and second roll supports, wherein the adjusting devices comprises means for position control or force control.

11. The device according to claim 10, wherein the adjusting device comprises controlled, direction-reversing hydraulic cylinders configured to act on the segments in the area of the jointed connections, wherein the first segment has an inlet side and an exit side and has only one of the hydraulic cylinders correlated therewith in the area of the exit side.

ABSTRACT OF THE DISCLOSURE

In a method for changing the section of a billet of a continuous casting plant during continuous casting, wherein opposed sides of the billet are in contact with oppositely positioned roll supports arranged below a continuous casting die, wherein the roll supports are comprised of segments having rolls, wherein adjoining ones of the segments of each roll support are connected to one another by a jointed connection and wherein each segment is configured to be adjustable independent of the other segments with respect to an angular position relative to the billet, and wherein in an initial position the segments of the roll supports are adjusted to a uniform billet section, a thickness reduction can be achieved by advancing sequentially in a direction of continuous casting the segments toward the billet by moving the jointed connections toward the billet in a controlled sequence of adjusting steps or a thickness increase can be achieved by moving sequentially in a direction of continuous casting the segments away from the billet by moving the jointed connections away from the billet in a controlled sequence of adjusting steps.

b.)

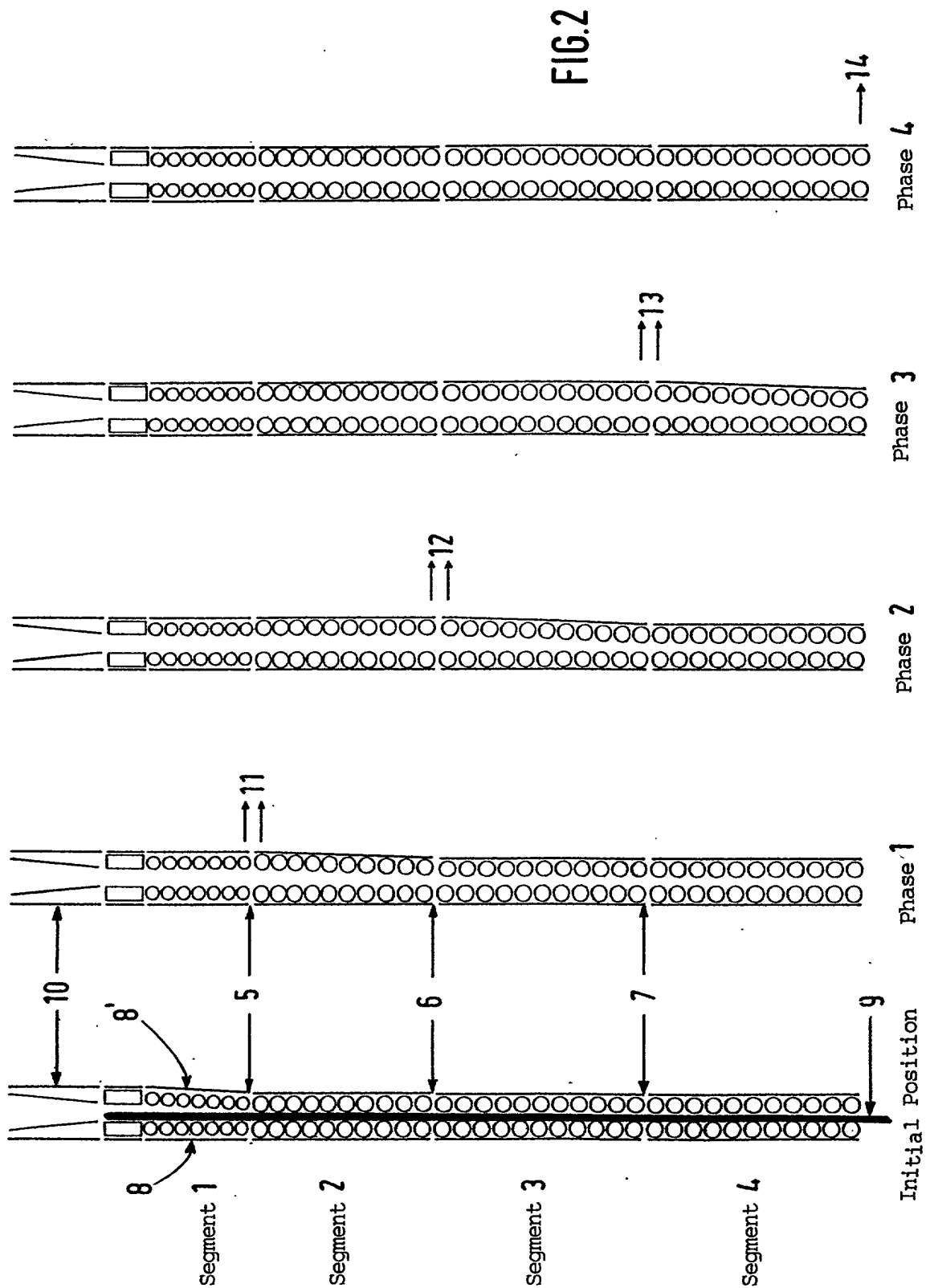


FIG. 2

Declaration and Power of Attorney for Patent Application
Erklärung für Patentanmeldungen mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

daß mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

daß ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird and für den ein Patent beantragt wird für die Erfindung mit dem Titel:

**VERFAHREN UND VORRICHTUNG ZUR
FORMATDICKENÄNDERUNG DES GUßSTRANGES EINER
STRANGGIEßANLAGE IM KONTINUIERLICHEN
GIEßBETRIEB**

deren Beschreibung
(Zutreffendes ankreuzen)

☒ hier beigefügt ist.

☐ am _____ unter der
Anmeldungsseriennummer _____
eingereicht wurde und am _____
abgeändert
wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, daß ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag, wie oben erwähnt, abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Patentierbarkeit in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder ein Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**METHOD AND DEVICE FOR CHANGE OF SECTION
OF A BILLET OF A CONTINUOUS CASTING PLANT
DURING CONTINUOUS CASTING**

the specification of which (check one)

☒ is attached hereto

☐ was filed on Application Serial No. _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Erklärung mit Vollmacht (auf Deutsch)

Declaration and Power of Attorney (in English)

<u>199 33 635.0</u>	<u>Germany/Deutschland</u>	<u>July 17, 1999/17. Juli 1999</u>	<u>X</u>	
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Nummer)	(Land)	(Tag/Monat/Jahr eingereicht)	Ja	Nein
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Nummer)	(Land)	(Tag/Monat/Jahr eingereicht)	Ja	Nein
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Nummer)	(Land)	(Tag/Monat/Jahr eingereicht)	Ja	Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 112, offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder internationalen Anmeldedatum dieser Anmeldung bekannt sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or international filing date of this application.

(Application Serial No.) (Filing Date)
(Anmeldeseriennummer) (Anmeldedatum)

(Application Serial No.) (Filing Date)
(Anmeldeseriennummer) (Anmeldedatum)

(Status/ patentiert
anhangig, aufgegeben)

(Status/ patentiert
anhangig, aufgegeben)

(Status/ patented,
pending, abandoned)

(Status/ patented,
pending, abandoned)

Ich erkläre hiermit, daß alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und daß ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, daß wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden können, und daß derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Erklärung mit Vollmacht (auf Deutsch)

Declaration and Power of Attorney (in English)

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäft vor dem Patent-und Warenzeichenamt:

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

FRIEDRICH KUEFFNER, Reg. No. 29,482

FRIEDRICH KUEFFNER, Reg. No. 29,482

Telefongespräche bitte richten an:
(Name und Telefonnummer)

Direct telephone calls to:
(Name and telephone number)

Friedrich Kueffner
(212) 986-3114

Friedrich Kueffner
(212) 986-3114

Postanschrift:

Send Correspondence to:

Friedrich Kueffner
342 Madison Avenue, Suite 1921
New York, NY 10173

Friedrich Kueffner
342 Madison Avenue, Suite 1921
New York, NY 10173

Voller Name des einzigen oder ursprünglichen Erfinders:

Axel Weyer

Full name of first or sole inventor:

Axel Weyer

Unterschrift des Erfinders

Datum

Inventor's Signature

Date

Wuppertal, Deutschland
Wohnsitz

Wuppertal, Germany
Residence

Deutsch
Staatsangehörigkeit

German
Citizenship

Rauhaus Feld 27

Rauhaus Feld 27

42349 Wuppertal, Deutschland
Postanschrift

42349 Wuppertal, Germany
Post Office Address

Erklärung mit Vollmacht (auf Deutsch)

Declaration and Power of Attorney (in English)

Voller Name des zweiten Miterfinders:		Full name of second joint inventor:	
Dirk Letzel		Dirk Letzel	
Unterschrift des Erfinders	Datum	Inventor's Signature	Date
<u>Ratingen, Deutschland</u> Wohnsitz		<u>Ratingen, Germany</u> Residence	
<u>Deutsch</u> Staatsangehörigkeit		<u>German</u> Citizenship	
<u>Plättchesheide 5</u>		<u>Plättchesheide 5</u>	
<u>40878 Ratingen, Deutschland</u> Postanschrift		<u>40878 Ratingen, Germany</u> Post Office Address	

Voller Name des dritten Miterfinders:		Full name of third joint inventor:	
Reiner Külchen		Reiner Külchen	
Unterschrift des Erfinders	Datum	Inventor's Signature	Date
<u>Krefeld, Deutschland</u> Wohnsitz		<u>Krefeld, Germany</u> Residence	
<u>Deutsch</u> Staatsangehörigkeit		<u>German</u> Citizenship	
<u>Rembertstraße 92</u>		<u>Rembertstrasse 92</u>	
<u>47809 Krefeld, Deutschland</u> Postanschrift		<u>47809 Krefeld, Germany</u> Post Office Address	

Erklärung mit Vollmacht (auf Deutsch)

Declaration and Power of Attorney (in English)

Voller Name des vierten Miterfinders:		Full name of fourth joint inventor:	
Adolf Zajber		Adolf Zajber	
Unterschrift des Erfinders	Datum	Inventor's Signature	Date
<u>Langenfeld, Deutschland</u>		<u>Langenfeld, Germany</u>	
Wohnsitz		Residence	
<u>Deutsch</u>		<u>German</u>	
Staatsangehörigkeit		Citizenship	
<u>Gartenstraße 7</u>		<u>Gartenstrasse 7</u>	
<u>40764 Langenfeld, Deutschland</u>		<u>40764 Langenfeld, Germany</u>	
Postanschrift		Post Office Address	